Acute Infections

Background
- Old surgical and anatomy texts had great emphasis on the anatomy of infection
- Becoming less common (in 1st world)
  - Antibiotics
  - Medical care closer and more rapidly available
  - Better control of diabetes
- Resurgence:
  - IV drug abuse
  - TB

Acute and Chronic
- Acute
  - Penetrating injury
    - Blade, gravel, urchin spine etc
  - Animal bite
  - Haematogenous
  - Post-operative
- Chronic
  - TB
  - Mycobacter Marinum
  - Fungal paronychia

Specific Infections
- Necrotising Fasciitis
- Nail bed
- Pulp
- Web space
- Flexor tendon sheath
- Deep palmar spaces
- Radial and Ulnar bursa
- Collar stud abscess
- Metacarpophalangeal joint

Summary
- Background
- Specific Infections
- Necrotising Fasciitis
- Nail bed
- Pulp
- Web space
- Flexor tendon sheath
- Deep palmar spaces
- Radial and Ulnar bursa
- Collar stud abscess
- Metacarpophalangeal joint

Anatomy
- Several closed or interconnecting spaces in the hand
  - Determines location of infection
  - Clear anatomical understanding is needed for:
    - Safe treatment
    - Effective treatment
    - Infection in closed space can rapidly cause necrosis
      - Stiffness
      - Pain
      - Reduced function

Mycobacter and Fungal Infections
- Tend to be Chronic
- Not covered in his lecture
Principles of treating acute infection

- Swab
- Immediate Washout
- Antibiotics
- Elevation
- Splinting
- Surgical drainage
  - if needed

Antibiotics

- Depends on cause
- 80% staphylococcus
- Fluclaxacillin/clindamycin
  - Penetrating injury
  - Presumed haematogenous
  - Post-op
- Agricultural
  - Add metronidazole
- Animal bites
  - NEXT SLIDE!

Animal Bites

- NB high risk of
  - Deeper structural damage
    - Crush, laceration
  - Retained pathogen in closed space
  - CONSIDER EARLY SURGERY on all but the most minor bites
- Microbiology
  - Dogs, cats
    - Staph, skin, Pasteurella (canis, septica, multocida)
  - Humans
    - Staph, skin, Eikenella corrodens
- Antibiotics
  - Augmentin
  - Doxycycline

Surgical Treatment

- NB Low threshold for surgery
- Do not delay!
  - If failing to settle
  - Symptoms of ischaemia (severe pain, tingling)
  - Abcess formation
  - Flexor sheath
  - Worsening systemic illness

SUMMARY

- Background
- Specific Infections
  - Necrotising Fasciitis
  - Nail bed
  - Pulp
  - Web space
  - Flexor tendon sheath
  - Deep palmar spaces
  - Radial and Ulnar bursa
  - Collar stud abscess
  - Metacarpophalangeal joint

Necrotising Fasciitis

- Surgical Emergency
  - 76% mortality!
- Predisposed
  - Diabetic
  - Immunocompromised
  - IODS
  - Young
- Bacteriology
  - Toxin producing virulent bacteria
Necrotising Fasciitis

- Presentation
  - Cellulitis
  - Rapidly advancing indistinct edge
  - Skin beyond edge shiny non-pitting oedema
  - Relative sparing of skin
  - Skin has grey hue with purple blotches
  - Disproportionate pain beyond the oedema
  - Sicker patient
  - Dishwater pus

Nec Fasc

- Diagnostic tests
  - X-rays: free air
  - LRINEC score
  - Laboratory Risk Indicator for Necrotising Fasciitis

- Management
  - Clindamycin
  - Oxygen and Fluids
  - Immediate surgery
    - Radical debridement inc proximal amputation

Nail bed
Paronychia

- Closed space beneath eponychial fold
  - Staph aureus
  - Occasionally chronic fungal infection
  - Nail biters and cuticle-pickers
  - Hairdressers

- Spread
  - Along side of nail fold distally
  - Beneath the nail plate

Nail bed infection
Early surgical treatment

Nail bed infection
Subungual spread

Entire nail fold or chronic infection

Nail bed infection
Subungual spread

Entire nail fold or chronic infection
Nail bed cyst
- Connected with DIPJ
- Can develop septic arthritis if cyst is infected
- Do not pop with needle...

Pulp Space Infection - Felon
- **Cause**
  - Penetrating injury
  - Often trivial
- **Anatomy**
  - Fascial septae between skin and periosteum
  - Form closed spaces
  - Very painful
- **Spread**
  - Skin necrosis
  - Osteomyelitis
  - Tendon sheath
  - DIP joint

Pulp space infection - Drainage
- **Use**
  - Midlateral
  - Midline
- **Avoid**
  - Fish-mouth incision
  - Necrosis

Herpetic Whitlow
- Usually dental infection
  - Herpes simplex virus
- Presentation
  - Very painful
  - Very tender
  - Vesicles break out
- Self limiting
  - 10 days
- Do not drain
- Recurrence
  - 30-50%
  - Tingling painful prodrome

Web space infection
References

Web space

Finger

- Complex anatomy
  - Natatory ligament
  - Transverse intermetacarpal ligament
  - Neurovascular bundle
  - Lumbrical canal
    - Palmar to transverse metacarpal ligament
  - Interosseous canals
    - Dorsal to transverse metacarpal ligament
  - Loose connective tissue

Web space

Treatment

- Longitudinal incision
  - Avoids scar contracture
  - Loss of span
  - Extensile
  - Safer
    - Parallel to neurovascular bundle

Flexor tendon sheath

- Cause
  - Staph aureus
    - Penetrating injury
    - Extension form felon
  - Rarely haematogenous
  - Trigger finger injection

- Effect
  - Rapid spread in closed space
  - Tendon ischemia
  - Trigger finger injection
  - Pain in active flexion

Kanavel's Signs

- Flexed posture of digit
- Tender along course of tendon
- Pain on passive finger extension
- Pain in active flexion

Allen B. Kanavel MD FACS 1874-1938
Treatment

- Elevate
- Antibiotics
- Short-term splinting
- Early surgery if not settling!

Deep Palmar Spaces

- Vertical septum from 3rd metacarpal
- Midpalmar space = medial space
- Thenar space = radial space

Deep palmar space infection

- Causes
  - Spread
  - Web space infection
  - Flexor sheath infection
  - Penetrating Injury
Drainage of medial space

Incision

Drainage of lateral space

Incision

Avoid NVB
- Deep to superficial fascia
- Motor branch
  - Very vulnerable!

Radial and Ulnar Bursa
- Synovial sheath proximal extension
  - Thumb
  - Little finger
- Flexor tendon sheath infection
  - Spreads proximally in front of wrist

Horse-shoe abscess
Radial bursa
Thumb flexor sheath

Drainage of radial bursa

Drainage of Ulnar Bursa

Collar Button Abscess
- Subcutaneous infection
  - Palmar Callosity
  - Biter
- Penetration
  - Palmar to dorsal
  - Through aponeurosis
- Drainage
  - Palmar & dorsal incision

Infection
Fight Bite

Fight Bite
- Tooth penetrates
  - Skin
  - Subcutaneous fat
  - Tendon
  - Capsule
  - Synovium
**Shutter**

**Consequence**
- Closed space
  - Bacteria Trapped in joint as fist released
- Infective Arthropathy
  - Stiffness
  - Pain

**Bacteria**
- Alpha Haem strep viridans
- Eikonella Corrodens
- Streptococcus Anginosus
- Anaerobes
  - Prevotella
  - Fusobacterium

**Viral Transmission**
- Very rare but reported
- Hepatitis

**Antibiotics**
- Ampicillin or Augmentin

**High index of suspicion**
- Small cut
- Patient tells a lie

**Wash out wound in ER**
- Saline and cannula
- IV Antibiotics
- Formal exploration

**Drainage**
- Dorsal incision over joint
- Divide longitudinally
  - tendon, capsule, synovium
- Thorough lavage and synovectomy
- Close tendon

**Background**

**Specific Infections**
- Nail bed
- Pulp
- Web space
- Flexor tendon sheath
- Deep palmar spaces
- Radial and Ulnar bursa
- Collar stud abscess
- Metacarpophalangeal joint
Acute Infections

Professor David Warwick
MBBS(Eng), FRCS(Eng), FRCS(Orth), European Diploma Hand Surgery
Consultant Hand Surgeon
University Hospital Southampton

www.handsurgery.co.uk